CLAIMS

1. Process for the anionic polymerization of lactams, in which:

(a) (i) a catalyst capable of creating a lactamate and (ii) a regulator chosen from the amides of formula R1-NH-CO-R2, in which R1 can be substituted with a radical R3-CO-NH- or R3-O- and in which R1, R2 and R3 denote an aryl, alkyl or cycloalkyl radical, are dissolved in the molten lactam; the temperature of this reaction mixture being between the melting point of the lactam and 15°C higher,

(b) the solution from step (a) is introduced into a mixing device and is then heated to a temperature which is sufficient to obtain bulk polymerization of the lactam in no more than 15 minutes.

2. Process according to Claim 1, in which molten lactam not containing the mixture of catalyst and regulator is also introduced in step (b).

3. Process according to either of the preceding claims, in which the polymerization of the lactam is carried out in the presence of one or more polymers (A) which are introduced either into the solution (a) or into the mixing device in step (b) or into the molten lactam which is added in addition to that originating from (a) or according to any combination of these possibilities.

4. Process according to any one of the preceding claims, in which the polymerization of the lactam is carried out in the presence of one or more fillers which are introduced either into the solution (a) or into the mixing device in step (b) or into the molten lactam which is added in addition to that originating from (a) or according to any combination of these possibilities.

5. Process for the anionic polymerization of lactams, in which:

(a) (i) a catalyst capable of creating a lactamate and (ii) a regulator chosen from the amides of formula R1-NH-CO-R2, in which R1 can be substituted with a radical R3-CO-NH- or R3-O- and in which R1, R2 and R3 denote an aryl, alkyl or cycloalkyl radical, are dissolved in the molten lactam; the temperature of this reaction mixture being between the melting point of the lactam and 15°C higher,

(b1) the solution from step (a) is introduced into a mould and is then heated to a temperature which is sufficient to obtain bulk polymerization of the lactam in no more than 15 minutes.

6. Process according to Claim 5, in which molten lactam containing neither catalyst nor regulator is added in step (b1) in addition to the solution from step (a) and this molten lactam is optionally mixed in line with that obtained from step (a) before introduction in the mould.

7. Process according to Claim 5 or 6, in which the polymerization of the lactam is carried out in the presence of one or more polymers (A) which are introduced either into the solution from step (a) or into the mould or into the molten lactam which is added in addition to that originating from (a) or alternatively during the in-line mixing of the lactam originating from (a) and of the lactam added in addition to that originating from (a) or a combination of all these possibilities.

8. Process according to any one of Claims 5 to 7, in which the polymerization of the lactam is carried out in the presence of one or more fillers which are introduced either into the solution from step (a) or into the mould or into the molten lactam which is added in addition to that originating from step (a) or alternatively during the in-line mixing of the lactam originating from (a) and of the lactam added in addition to that originating from (a) or a combination of all these possibilities.

9. Process according to any one of the preceding claims, in which the catalyst is chosen from sodium, potassium, alkali metal hydrides and hydroxides, and alkali metal alkoxides such as sodium methoxide or ethoxide.

10. Process according to any one of the preceding claims, in which the regulator is chosen from acetanilide, benzanilide, N-methylacetamide, N-ethylacetamide, N-methylformamide, (4-ethoxyphenyl)-acetamide and alkylenebisamides such as ethylenebis-stearamide (EBS) and ethylenebisoleamide.

11. Process according to any one of the preceding claims, in which the ratio of the catalyst to the regulator, in moles, is between 0.5 and

2 and preferably between 0.8 and 1.2; the number of moles of regulator being expressed as the number of moles of amide groups.

12. Process according to any one of the preceding claims, in which the proportion of catalyst in the lactam in step (b1) is between 0.1 mol and 5 mol per 100 mol of lactam and preferably between 0.3 and 1.5.

13. Process according to any one of the preceding claims, in which the lactam is lauryllactam, the temperature of step (a) is between 155 and 180°C and preferably between 160 and 170°C, and the temperature of step (b) or (b1) is between 200 and 350°C and preferably between 230 and 300°C.